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PROCESSING FRESH MUSSELS (*M. GALLOPROVINCIALIS*) BY *SOUS VIDE* TECHNOLOGY: EFFECT ON THE MICROBIOLOGICAL CHARACTERISTICS

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INTRODUCTION

Sous-vide cook-chilled (SVCC) refers to food that is subjected to vacuum-pack and then mild heat treated under controlled conditions (t and T) and subsequently rapidly cooled and stored at chilled conditions until heated before serving (Rhodehamel, 1992; Hansen *et al.,* 1995). Few studies reported the application of this process for aquaculture products (Espinosa *et al.,* 2016; Shakila *et al.,* 2009), such as trout fillets (Gonzalez-Fandos et al., 2004), salmon (Garcia-Linares et al., 2004, Gonzalez-Fandos *et al.,* 2005; Diaz *et al.,* (2009) and carp (Can, 2011) and there is no evidence of the application of this technology in molluscs.

AIM

Evaluate the effect of SVCC technology on the microbiological characteristics of mussels (*M. galloprovincialis*).

MATERIALS AND METHODS

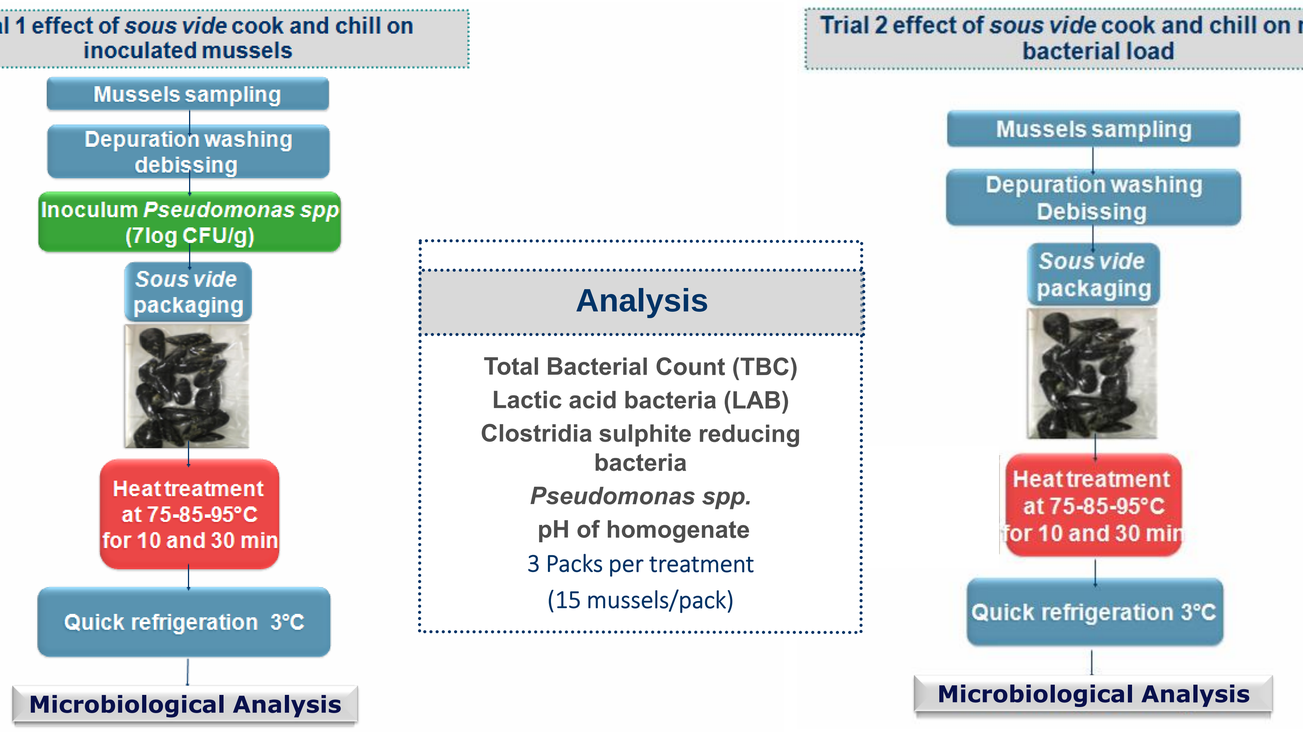

Fig. 1 Experimental design and analytical determination.

Fig. 2 Preparation of inoculated mussels (A), packaging (B), cooking (C), temperature monitoring (D), microbiological analysis (E).

RESULTS

TRIAL 1. EFFECT OF SOUS VIDE COOK AND CHILL ON INOCULATED MUSSELS

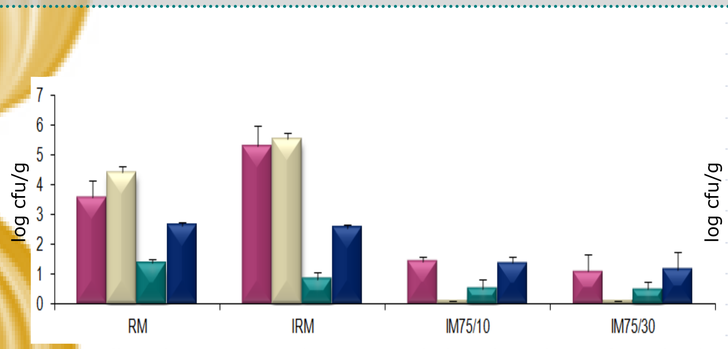

Fig. 3 Effect of processing condition on microbiological population of inoculated mussel (IM) with *Pseudomonas spp.;* RM, raw mussel; IRM, inoculated raw mussel; IM75/10-30, inoculated mussel and processed at 75°C for 10 or 30 min. Data are mean values ±SD of 3 packs per group.

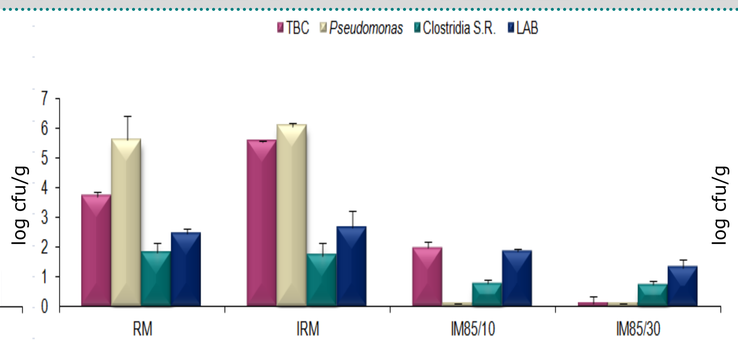

Fig. 4 Effect of processing condition on microbiological population of inoculated mussel (IM) with *Pseudomonas spp.*; RM, raw mussel; IRM, inoculated raw mussel; IM85/10-30, inoculated mussel and processed at 85°C for 10 or 30 min. Data are mean values ±SD of 3 packs per group.

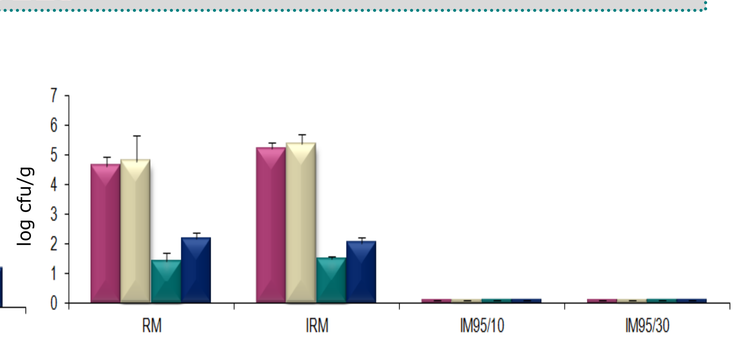

Fig. 5 Effect of processing condition on microbiological population of inoculated mussel (IM) with *Pseudomonas spp.*; RM, raw mussel; IRM, inoculated raw mussel; IM95/10-30, inoculated mussel and processed at 95°C for 10 or 30 min. Data are mean values ±SD of 3 packs per group.

TRIAL 2. EFFECT OF SOUS VIDE COOK AND CHILL ON MUSSELS NATURAL BACTERIAL CONTAMINATION

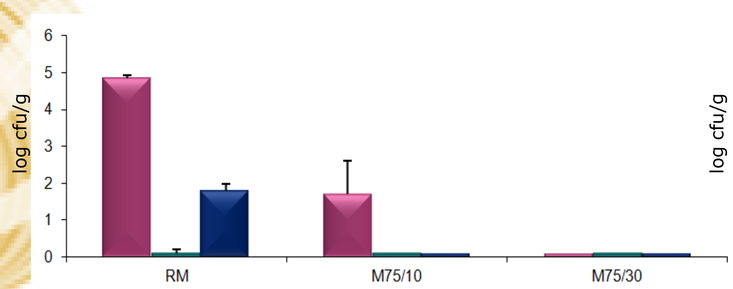

Fig. 6 Effect of processing condition on microbiological population of mussel natural bacterial load. RM, raw mussel; IRM, inoculated raw mussel; IM75/10-30, inoculated mussel and processed at 75°C for 10 or 30 min. Data are mean values ±SD of 3 packs per group.

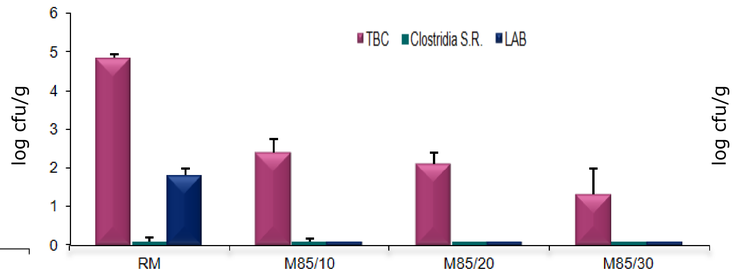

Fig. 7 Effect of processing condition on microbiological population of mussel natural bacterial load. RM, raw mussel; IRM, inoculated raw mussel; IM85/10-30, inoculated mussel and processed at 85°C for 10 or 30 min. Data are mean values ±SD of 3 packs per group.

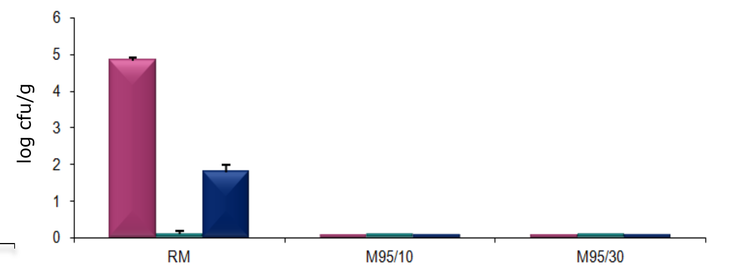

Fig. 8 Effect of processing condition on microbiological population of mussel natural bacterial load. RM, raw mussel; IRM, inoculated raw mussel; IM95/10-30, inoculated mussel and processed at 95°C for 10 or 30 min. Data are mean values ±SD of 3 packs per group.

- All t/T combinations resulted in a substantial reduction of the *Pseudomonas spp*. population (<1 log CFU/g) both in raw (4.9 log CFU/g) and experimentally inoculated (5.7 log CFU/g) mussels.
- The pH values (6.22) of the homogenate resulted not affected by the heat treatments (data not shown).
- Similar results were observed on natural microbial contamination of mussel. A TBC reduction (2.4 log and 3.5 log, respectively) was registered after treatment at 85 °C for 10 or 30 min, while the highest reduction (4.8 log) was observed at 95 °C for 10 min confirming the efficacy of *sous vide* cook treatments even for fresh mussels.

CONCLUSIONS

- **The present study confirms the effectiveness of SVCC technology to reduce the microbial population present in raw mussels.**
- **Future research will be aimed to assess technological and sensorial traits of these products, as well as their stability both under refrigeration and thermal abuse conditions during storage.**

REFERENCES

Can Ö. P. (2011). *World Academy of Science, Engineering and Tecnology,* 56, 1225-1230; **Diaz *et al.,* 2009**. *Fishing Chimes,* 23 (1), 131-136; **Espinosa *et al.,* 2016**. *Food Science and Technology International*; **Garcia-Linares *et al.,* 2004**. *Journal of Food Quality*, 27, 371–387; **Gonzalez-Fandos *et al.,* 2004**. *Food Microbiology*, 21,193–201; **Gonzalez-Fandos *et al.,* 2005**. *Food Control* 16, 77–85; **Hansen *et al.,* 1995.** *International Journal of Food Science and Technology*, 30, 365–378; **Rhodehamel, 1992.** *Food Technology*, 46, 73–76; **Shakila *et al.,* 2009**. *International Journal of Food Science an Technology, 44*, 2120-2126.

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